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TCD Stroke Workgroup Recommendations Regarding TCD Stroke Center Designation

EDITING NOTES

Key words are in RED In both the TCD Workgroup Recommendations and in the draft TCD Stroke Center regulation template.

Numbering locates a crosswalk between key words.

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Key Words and Numbering

TCD Stroke Workgroup recommendations for Stroke Center Designation "crosswalk" to draft TCD Stroke Regulation template

1. Core Measures / Registry / Data
2. Treatment / Timelines
3. Hospital / Administration
4. Network / Transfer or Network Agreements / Network Resource / Hub & Spoke
5. Medical Director
6. Physicians / all types of Neuro physicians / other physicians
7. Stroke Team
8. Telemedicine / Telecommunications
9. Brain Images / CT Scan
10. Protocols
11. Education / CME/CEU / Credentials
12. Radiology
13. Emergency Department
14. Stroke Unit
15. ICU
16. Stroke Coordinator
17. Rehabilitation
18. Research
19. Multidisciplinary Team
20. Public Education Outreach
21. Quality Assurance / Quality Improvement
22. Equipment
23. Case Managers / Social Workers
24. Lab

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Level I
TCD Comprehensive Stroke Centers

- Requirements:
  - Meets the requirements specified in the Consensus Statement of Stroke on Comprehensive Stroke Centers. (Recommendations for comprehensive Stroke centers: a consensus statement from the Brain Attack Coalition. Stroke. 2005; 36(7):1597-616.
  - Meets the requirements specified for a Primary Stroke Center as specified by The Joint Commission.
  - Follows current Joint Commission Core Measures_____1
    - DVT prophylaxis
    - Discharged on antithrombotic therapy
    - Patients with A-Fibrillation receiving anticoagulation
    - Thrombolytic therapy administered
    - Antithrombotic therapy by end of hospital day 2
    - Discharged on cholesterol-reducing medication
    - Dysphagia screening
    - Stroke education
    - Smoking cessation education/advice/counseling
    - Assessed for rehabilitation

  - Follows the Brain Attack Coalition's benchmark Treatment Times_____2
    - Door to physician exam = 10 minutes
    - Door to Stroke Team Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes

  - Accepts transfers from Level II, III, IV hospitals_____ 4
  - Hospital and Administration support_____ 3
  - Transfer Agreements in place to serve as "Hub" for lower level hospitals in the region_____ 4
  - Institution has and maintains a Stroke Registry_____ 1

- Medical Director—include 3 or more of the following_____5, 11
  - Board certified neurologist or vascular neurosurgeon with a stroke fellowship, or neurocritical care fellowship, or vascular neurosurgery fellowship or equivalent experience
  - Board certified in vascular neurology or neurocritical care
  - Fellow of the Stroke Council of the AHA
  - Clinician who diagnoses and treats at least 50 patients with cerebrovascular disease annually or more than 50% of his/her time is dedicated to the care of cerebrovascular patients and/or research on cerebrovascular disease
  - Clinician with at least 10 peer-reviewed publications dealing with cerebrovascular disease
  - Clinician with at least 12 CME credits each year in areas directly related to cerebrovascular disease

- Neurologists and NeuroSurgeons_____2,6,7,11
  Board certified/board eligible
    - Neurosurgical expertise shall be available 24/7, response time in person or by phone is within 5 minutes
    - There shall be personnel in-house (or be at the hospital within 20 minutes) who are capable of performing emergent neurosurgical procedures. Shall have expertise and experience in microsurgery for aneurysm clipping and surgical excision of AVM's
    - Written neurosurgical Call Schedules shall be available
    - Institution shall care for at least 30 SAH patients per year and shall accomplish at least 10 craniotomies per year for aneurysm clipping and at least 10 endovascular coilings of aneurysms.
    - Each Neurosurgeon shall participate in at least 10 cases per year

        - Perioperative mortality rate for aneurysm clipping shall be documented, reviewed and compared with published outcomes.
        - For AVM, treatment shall be available including microsurgical excision, endovascular embolization and stereotactic radiosurgery
        - 8 CME credits in area directly related to cerebrovascular disease

- Acute Stroke Teams_____1,2,7,8
    - Physicians with experience in diagnosing and treating cerebrovascular disease
    - Hospital based Stroke Team shall be available within 15 minutes by phone and at the bedside within the time period as designated by the stroke center director 24/7
    - Response time may also be accomplished through Telemedicine
        - Evidence of Stroke Team Log containing_____1,7
        - Response times
        - Patient diagnosis
        - Treatments and actions
        - Outcomes
    - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed and interpreted within 45 minutes of it being ordered_____2, 9
    - Monitoring systems
        - Heart rate / rhythm with automatic arrhythmia detection
        - Blood pressure with noninvasive BP monitoring
        - Oximetry

- Written Care Protocols_____10
    - Written protocols/care paths for the acute workup and treatment are available in the
        - ED _____ 10 13
        - ICU_____ 10,15
        - Stroke Unit_____10,14
    - Protocols include management of:
        - Ischemic stroke
        - Hemorrhagic stroke
        - tPA treatment
        - Interventional treatment (neurovascular)

- IV Thrombolytic Therapy_____2, 10
    - The organization's formulary or medication list shall include a thrombolytic therapy (IV administered) medication for ischemic stroke
    - Documentation indicates the reason eligible ischemic stroke patients did not receive an IV thrombolytic therapy
    - Emergency department licensed independent practitioners have 24 hour access to a timely, informed consultation about the use of IV thrombolytic therapy, obtained from a physician, privileged in the diagnosis and treatment of ischemic stroke.
    - Use of the protocol, including IV thrombolytic therapy when indicated by the treating licensed independent practitioner, is reflected in the order sets or pathways, and is documented in the patient's medical record according to organizational procedure.
    - There is evidence that specific stroke performance measurement data, focused on use of IV thrombolytic therapy, are evaluated the quality improvement process and by the stroke team

- Telemedicine / Telecommunication _____8
    - Institution able to function as Hub for referral hospitals
    - Available 24/7

- Physicians who perform Carotid Endarterectomy (CEA)
    - Surgeons with expertise in performing CEA's
    - Surgeons as a group shall perform a minimum number of 10 CEA's per year
    - Results shall be audited on a yearly basis, and the results of a rolling average of at least 3 years shall be compared with published outcome and complication rates.

- Diagnostic Radiologists_____12
  - Able to evaluate imaging studies 24/7
  - Available to read scans within 20 minutes of completion
  - Active full time staff
  - Board certified/board eligible

- Neuro endovascular Specialist(s)_____6,11
  - Trained in neuroradiology, neurosurgery, vascular surgery, neurology, or cardiology
  - Completed neuroendovascular training that included minimum recommended standards for diagnostic angiography and neuroendovascular interventions as recommended by the major specialty societies and/or boards
  - Available 24/7
  - Board certified/board eligible in the specialty
  - Results shall be audited on a yearly basis, and the results of a rolling average of at least 3 years shall be compared with published outcome and complication rates. Cases shall be peer reviewed as see fit by the institution.

- Emergency Department (ED) personnel (physicians, nurses and EMS) _____2, 10, 11, 13
  - Written care protocols for acute stroke patients shall be available to EMS and ED personnel, and shall be reviewed and revised annuallyAnnual review of EMS protocols with EMS medical director shall include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients
  - ED protocols shall include
    - Well-defined and documented procedures for calling the acute Stroke Team
    - Goal door to needle time of 60 minutes or less for the administration of tPA to stroke patients
  - ED care providers are familiar with
    - Pathology, presentation, assessment, diagnostics, and treatment of patients with acute stroke
    - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
    - The recognition, assessment and management of acute stroke complications.
  - Eighty percent of ED practitioners are knowledgeable of the patho physiology, presentation, assessment, diagnostics, and treatment of patients with acute stroke including
    - Initial treatment plan: treatment of the patient during the first three hours of care, including thrombolytic therapy for patients who present within three hours of initial onset of symptoms.
    - Indications for use of IV thrombolytic therapy
    - Contraindications to IV thrombolytic therapy
    - Education to be provided to patients and families regarding the risks and benefits of IV thrombolytic therapy
    - Signs and symptoms of neurological deterioration post IV thrombolytic therapy
  - ED and CSD staff shall meet with EMS to review patient care issues with the CSC staff at least twice a year
  - At least 2 specific assessment criteria and benchmarks (quality assurance) related to acute stroke care shall be defined, measured and reviewed annually
  - ED personnel obtain 8 hours of continuing education or equivalent educational program annually that focus on acute stroke care.

- Radiology Technologists_____2, 9, 12
  - In-house CT technician 24/7

- MRI technician available 24/7 (may take call from home as long as he/she can be at the hospital and MRI completed and interpreted within 2 hours)
- Available to perform CT scans within 25 minutes of arrival for patients within 12 hours from symptom onset
- Available and able to perform CT angiography, CT perfusion and MRI with stroke specific sequences including perfusion as requested by stroke team

- Stroke Unit Nursing Staff _____14
  - Trained in the care of stroke patients
  - Trained in continuous cardiac and respiratory monitoring

- Dedicated Neurosciences Intensive Care Unit (ICU) staff_____ 11,15
  - The ICU nursing director or manager shall have at least10 hours per year of CEU training (or equivalent educational activities) related to cerebrovascular disease
  - The nurse: patient ratio in an ICU should be 1:1 or 1:2.
  - The ICU nursing staff shall be trained to assess neurologic function and deal with Neurocritical care:
    - Function of ventriculostomy and external ventricular drainage apparatus
    - Function and maintenance of ICP monitors
    - Treatment of ICP
    - Care of patients with ischemic stroke, intracerebral hemorrhage and subarachnoid hemorrhage
    - Care of patients after reperfusion therapy
    - Management of blood pressure with parenteral vasoactive agents in patients with central nervous system disorders
    - Management of intubated / ventilated patients
    - Detailed neurologic assessments and scales

  - ICU Nurses receive at least 10 hours per year of CEU credit (or other educational programs) in areas related to cerebrovascular disease including but not limited to_____11,15
    - Cerebral edema
    - Aspiration pneumonia
    - Infection
    - Myocardial infarction
    - DVT
  - Shall be familiar with standard neurologic assessments and scales, stroke protocols, care maps, ongoing research projects and new patients care techniques related to stroke.

- Stroke Coordinator - Full time_____11,16
  - Nurse practitioner or Certified Nurse Specialist
    Or
  - AANN certified registered nurse
  - Implement and coordinate the stroke program. Activities will include but are not limited to:
    - Monitor benchmarks
    - Patients and families education
    - Health care team education

- Physicians with expertise in critical care or Neuro intensive Care_____6, 11, 15
  - Board-eligible or board-certified neurologist, neurosurgeon, anesthesiologist, or internist who has completed either a critical care fellowship or Neurocritical care fellowship.
    - Care for at least 20 patients with acute strokes per year and attend at least 4 hours per year of CME activities (or similar educational programs related to or focused on cerebrovascular disease
    - Alternatively for those with critical care fellowship at least 25% of their patient population shall be stroke or critically ill neurological patients

- Physicians with expertise in echocardiography, carotid US, and Transcranial Doppler

- Technicians may take call from home as long as he/she can be at the hospital within 1 hour of being paged_____6

- Physical Medicine & Rehab physician(s) Rehabilitation services_____ 17
  - Directed by a physician with board certification in physical medicine and rehabilitation or by other properly trained individuals (i.e., neurologist experienced in stroke rehabilitation)

- Rehabilitation Therapists_____17
  - Consults for physical medicine and rehabilitation, PT, OT, and SLP shall be requested and assessment completed within 24 hours of admission if medically indicated
  - All therapists shall meet requirements for state licensure
    - At least1 year experience in the treatment of stroke survivors
    - Physical therapists and speech language pathologists shall complete a master's degree.
    - Occupational therapists must complete a master's degree

- Case Managers and Social Workers_____23
  - Social Workers and Case Managers shall meet requirements for state licensure
    - At least1 year experience in the treatment of stroke survivors
    - Social Workers shall complete a master's degree
    - Nurse Case Managers shall complete at least a bachelor's degree
    - Nurse Case Managers and Social Workers shall have adequate knowledge of inpatient rehabilitation facilities and community resources in their geographic region

- Multidisciplinary Team of health care professionals with expertise or experience in stroke representing__19
  - Clinical or Neuropsychology
  - Nutrition services
  - Pharmacy (including a Pharmacy Doctorate [Pharm D] with stroke expertise)

- Research_____20
  - Shall have the professional and administrative infrastructure necessary to conduct clinical trials
  - Actively participate in ongoing clinical research
  - Actively carry out investigator initiated clinical research projects

- Education_____11
  - Professional Education programs – CSC staff prepare and present at least 2 educational courses per year aimed at health care professionals within or outside of the CSC, and for Level II and Level IV designated Stroke Centers
  - Public Education – CSC sponsor at least 2 public educational activities each year that focus on some aspect of stroke_____20
    - Lectures
    - Screenings
    - Health fairs

- Stroke Registry or another similar data collection tool_____1
    - Length of Stay
    - Treatments received
    - Discharge destination and status
    - Incidence of complications
      - Aspiration pneumonia
      - UTI
      - DVT
    - Discharge medications

- Participate in a national and/or state Stroke Registry (or registries)_____1
  - Acute stroke therapy outcomes
    - IV tPA
    - Endovascular / interventional stroke therapy

- Multidisciplinary institutional Quality Assurance Committee shall meet on a monthly basis to monitor quality benchmarks and review complications_____ 1,2,19,21
    - Quality improvement
    - Correction of errors
    - Systems improvement
    - Overall care of patients
  - Documentation exists to reflect:
    - Performance measures and indicators tracked_____1
    - Specific interventions to improve in the selected measure
    - Specific outcomes to determine success
    - Implementation period and re-evaluation

- Serve as a Resource for Level II, III, and IV designated Stroke Centers_____4

- Diagnostic Imaging Equipment_____2, 22
  - MRI
    - Available 24/7
    - If medically indicated, MRI completed within 2 hours of th**e** test being ordered
      - Basic MRI
      - Diffusion-weighted (DWI) MRI
      - Magnetic resonance (MR) perfusion – optional
      - MR angiography (MRA)
      - MR venography (MRV)

  - Catheter Angiography
    - Cerebral Angiography must be available 24/7
    - Digital Subtraction angiography (DSA)
  - CT Angiography
    - CT Angiography (CTA)
    - CT perfusion - optional
  - Extracranial Utrasonography
    - Carotid US
      - Demonstrates acceptable proficiency using guidelines established by the Intersocietal Committee for the Accreditation of Vascular Laboratories (ICAVL) or a similar credentialing organization
  - Transcranial Doppler
    - The TCD laboratory shall track their results and seek certification from ICAVL or a similar organization
  - Transthoracic and Transesophagel Echocardiography
  - Tests of Cerebral Blood Flow and Metabolism

- Laboratory Services_____2, 24
  - Available 24/7 for initial stroke labs
    - CBC with platelet count
    - Coagulation studies (PT/INR)
    - Blood chemistries
  - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from arrival.
  - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing**.**
  - Comprehensive hematological and hypercoagulability profile testing

- Neurovascular Interventional Treatment_____2
  Discussion: A workgroup comment was received stating, “Intra-arterial thrombolysis and mechanical clot disruption are not yet FDA approved therapies we may want to consider not including that as a requirement for a Level I stroke center. However, if the center is doing these therapies, we should leave in the requirement to be involved in a registry. When these are approved as therapies we can go back and add them in.”

-
    - Neuro Endocascular Specialist (eg, endovascular surgical neuroradiologist, neurosurgeon, neurologist)_____6
        - Capability to perform neuroendovascular coiling or embolizations
        - IA thrombolysis
        - Mechanical thrombolysis
        - Carotid Angioplasty and stenting
        - Intracranial circulation angioplasty and stenting

    - Registry shall be established to track treatments, outcomes, and complications. For all the endovascular and surgical procedures performed, the number, indications, and outcomes should be recorded and available for review_____1

- Relationships with Other Levels of designated Stroke Centers _____4
    - Have a documented relationship with Level II, III and Level IV hospitals, to provide professional education as well as to receive transferred stroke patients as needed.

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Level II
TCD Primary Stroke Centers

- Requirements:
  - Meets requirements specified by the Brain Attack Coalition's recommendations for a Primary Stroke Center
  - Meets requirements specified for a Primary Stroke Center as specified by The Joint Commission

  - Core Measures _____1
    - DVT prophylaxis
    - Discharged on antithrombotic therapy
    - Patients with A-Fibrillation receiving anticoagulation
    - Thrombolytic therapy administered
    - Antithrombotic therapy by end of hospital day 2
    - Discharged on cholesterol-reducing medication
    - Dysphagia screening
    - Stroke education
    - Smoking cessation education/advice/counseling
    - Assessed for rehabilitation

  - Follows the Brain Attack Coalition's benchmark Treatment Times_____ 2
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes
  - Implement thrombolytic treatment and transfer for complex cases to a higher level of care.

  - Hospital and Administration support_____3

- Medical Director (This is in Level I, doesn't it need to be added to Level II and III?)_____ 4

- Acute Stroke Teams_____ 7
  - Physician with experience in diagnosing and treating cerebrovascular disease
  - Hospital based stroke teams shall be available within 15 minutes by phone and at the bedside within the time period as designated by the stroke center director 24/7.
  - Response time may also be accomplished through Telemedicine_____2,8
    - Evidence of stroke team log:_____ 1,7
      - Response times
      - Patient diagnosis
      - Treatments and actions
      - Outcomes

  - Brain Image (add wording from Level I?)_____2,9

- Written Care Protocols_____10
  - Written protocols/care paths for the acute workup and treatment are available in the
    - ED department
    - Acute care areas
    - Stroke units
    - Protocols include management of tPA treatment

- IV Thrombolytic Therapy_____2
  - The organization's formulary or medication list shall include a thrombolytic therapy (IV administered) medication for ischemic stroke
  - Documentation indicates the reason eligible ischemic stroke patients did not receive an IV thrombolytic therapy

  - Emergency department licensed independent practitioners have 24 hour access to a timely, informed consultation about the use of IV thrombolytic therapy, obtained from a physician, privileged in the diagnosis and treatment of ischemic stroke.
  - Use of the protocol, including IV thrombolytic therapy when indicated by the treating licensed independent practitioner, is reflected in the order sets or pathways, and is documented in the patient's medical record according to organizational procedure.
  - There is evidence that specific stroke performance measurement data, focused on use of IV thrombolytic therapy, are evaluated the quality improvement process and by the stroke team

- Telemedicine / Telecommunication (add wording from Level I?) _____2,8

- Emergency Medical Systems (This is only in Level II. Should it be in Level I, III, or IV?)
  - Treatment guidelines for pre-hospital personnel
  - EMS protocols shall include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients

- Emergency Department (ED)_____2,10,11,13
  - ED care providers are familiar with
    - Pathology, presentation, assessment, diagnostics, and treatment of patients with acute stroke
    - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
    - The recognition, assessment and management of acute stroke complications.
  - Eighty percent of ED practitioners must provide evidence that they are knowledgeable in the patho physiology, presentation, assessment, diagnostics, and treatment of patients with acute stroke including:
    - Initial treatment plan: treatment of the patient during the first three hours of care, including thrombolytic therapy for patients who present within three hours of initial onset of symptoms.
    - Indications for use of IV thrombolytic therapy
    - Contraindications to IV thrombolytic therapy
    - Education to be provided to patients and families regarding the risks and benefits of IV thrombolytic therapy
    - Signs and symptoms of neurological deterioration post IV thrombolytic therapy

- Radiology (This is in Level I, should it be in Level II?)_____12

- Stroke Unit (This wording is not in Level I, shouldn't it be?) _____10,11,14
  - Care providers demonstrate evidence of initial and ongoing training in the care of the acute stroke patient
  - Stroke protocols / care paths are followed
  - Receive 8 hours CEU's (or equivalent educational activity) yearly
  - Monitoring systems
    - Heart rate / rhythm with automatic arrhythmia detection
    - Blood pressure with noninvasive BP monitoring
    - Oximetry

- Neurologists_____2, 6
  - Board certified/board eligible
  - Neurologist shall be available 24/7, and response time is within 5 (20?) minutes

- Neuro Surgical Services_____2, 6
  - Neurosurgical services are available within 2 hours of when it is deemed clinically necessary or has protocol for transfer to appropriate facility

  - Facilities that do not transfer patients for neurosurgical emergencies has a fully functional OR facility and staff available within 2 hours of when it is deemed clinically necessary

- Radiology / Neuro Imaging _____2,12
  - Available 24/7
  - CT scans obtained within 25 minutes of being ordered
  - CT image evaluated by qualified personnel within 20 minutes of completion
  - Review of the images does not have to be done on site. Evaluation can be performed off site by telemedicine technology.
  - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed within 45 minutes of it being ordered_____1

- Laboratory Services_____2, 24
  - Available 24/7 for initial stroke labs
    - CBC with platelet count
    - Coagulation studies (PT/INT)
    - Blood chemistries
  - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from being ordered
  - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing
  - Comprehensive hematological and hypercoagulability profile testing

- Outcomes / Quality Improvement (adopt wording from Level I ?)_____21
  - Evidence of specific stroke performance measurement and review by quality improvement department and stroke team.
  - Documentation exists to reflect:
    - Performance measures and indicators tracked
    - Specific interventions to improve in the selected measure
    - Specific outcomes to determine success
    - Implementation period and re-evaluation

- Public Education Programs_____20
  - Minimum of one stroke public education activity per year

- Relationships with Other Stroke Level Hospitals_____4
  - Have a documented relationship with Level III and Level IV hospitals, to provide professional education as well as to receive transferred stroke patients as needed.

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Level III
TCD Support Stroke Centers

- Requirements:
  - Core Measures_____1
    - DVT prophylaxis
    - Discharged on antithrombotic therapy
    - Patients with A-Fibrillation receiving anticoagulation
    - Thrombolytic therapy administered
    - Antithrombotic therapy by end of hospital day 2
    - Discharged on cholesterol-reducing medication
    - Dysphagia screening
    - Stroke education
    - Smoking cessation education/advice/counseling
    - Assessed for rehabilitation

  - Follows the Brain Attack Coalition's benchmark Treatment Times_____2
    - Door to physician exam = 10 minutes
    - Door to Stroke Activation = 15 minutes
    - Door to CT Scan = 25 minutes
    - Door to CT Report = 45 minutes
    - Door to tPA = 60 minutes

  - Hospital / Administration support for a EMS policy to bypass this hospital to go to a higher level when pre hospital triage indicates need for higher level of care_____ 3
  - Participate as stroke hospital within a regional "Hub and Spoke" collaborating network with at least one regional Level I or Level II "Hub" hospital_____ 4
  - Establish and use a stroke treatment Telemedicine / Telecommunication collaboration with at least one regional Hub hospital _____ 8
  - Transfer Agreement in place with either Level I or Level II centers_____ 4

- Acute Stroke Teams_____2,7

  Acute stroke team members defined by the institution

  Physician/LIP with experience in diagnosing and treating cerebrovascular disease
    - Available within 5 minutes by phone and at the bedside within 20 minutes, 24/7.
    - Response time may also be accomplished through telemedicine.
  - Evidence of stroke team data collection_____**1, 7**
    - Response times
    - Patient diagnosis
    - Treatments and actions
    - Outcomes

- Written Care Protocols_____10
  - Written protocols/care paths for the acute workup are available in the ED
    - Ischemic and Hemorrhagic stroke care

- tPA Treatment
- Emergency Medical Systems
  - Treatment guidelines for pre-hospital personnel
  - EMS/first responder protocols shall include
    - Rapid, efficient patient assessment and triage
    - Prehospital EMS communication with hospital staff
    - Medical stabilization en route
    - Rapid communication between EMS and ED personnel during the transportation of acute stroke patients to a higher level of care

- Emergency Department (ED)_____10, 13
  - ED care providers are familiar with

        - Pathology, presentation, assessment, stroke scales, diagnostics, and treatment of patients with acute stroke
        - The location and application of stroke-related protocols, activation of the acute stroke team, and communications with inbound EMS
        - The recognition, assessment and management of acute stroke complications.
    - 80 percent of the ED care providers can provide evidence of review of the acute stroke protocol

- Neuro Surgical Services_____ 2, 6
    - Neurosurgical services are available within 2 hours of when it is deemed clinically necessary or has protocol for transfer to appropriate facility

- Neuro Imaging_____2, 9
    - Review of the images does not have to be done on site. Evaluation can be performed off site by telemedicine technology.
    - Documentation indicates that on a 24/7 basis, 80 percent of acute stroke patients have a diagnostic brain image completed and reviewed within 45 minutes of arrival.

- Laboratory Services – USE LANGUAGE FROM LEVEL I AND II_____2, 24
    - Available 24/7 for initial stroke labs
        - CBC with platelet count
        - Coagulation studies (PT/INR)
        - Blood chemistries
    - Documentation indicates the ability to complete and report lab tests in less than 45 minutes from arrival.
    - Documentation indicates the ability to perform an EKG and chest x-ray within the same time frame as laboratory testing.

- Outcomes / Quality Improvement_____21
    - Evidence of ongoing specific stroke performance measurement and review by quality improvement department and stroke team.
    - Documentation exists to reflect:
        - Performance measures and indicators tracked
        - Specific interventions to improve in the selected measure
        - Specific outcomes to determine success
        - Implementation period and re-evaluation

- Educational Programs _____20
    - Minimum of one stroke public education activity per year
    - Stroke team members:
        - NIHSS certification maintained
        - tPA competency annually
        - TCD education

- Documented Relationships with either a Level I or Level II Stroke Center_____4
    - Have a documented relationship with Level I and Level II hospitals, to receive professional education as well as to transfer stroke patients to those facilities as needed.

Level IV
Participating Hospitals

- Requirements:
  - These hospitals have an established Relationships with a Level I, II or III hospital for management and transport of the acute stroke patient_____4
  - Emergency Department (ED) staff trained in recognition of stroke signs and symptoms_____13
  - Protocols in place for rapid identification and transport_____4,10